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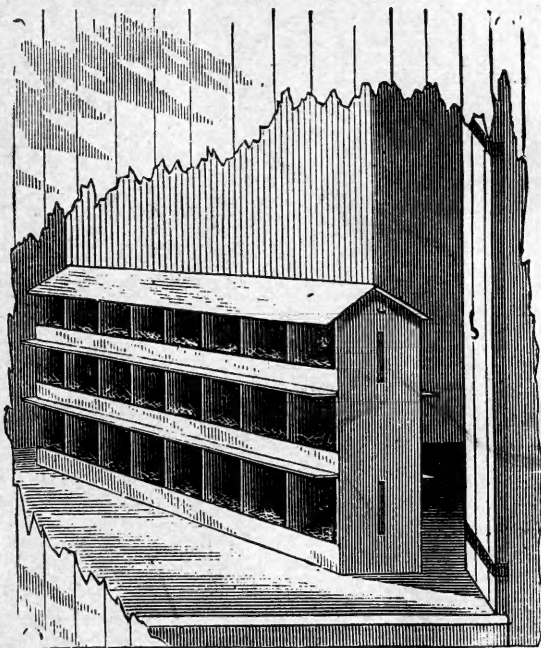






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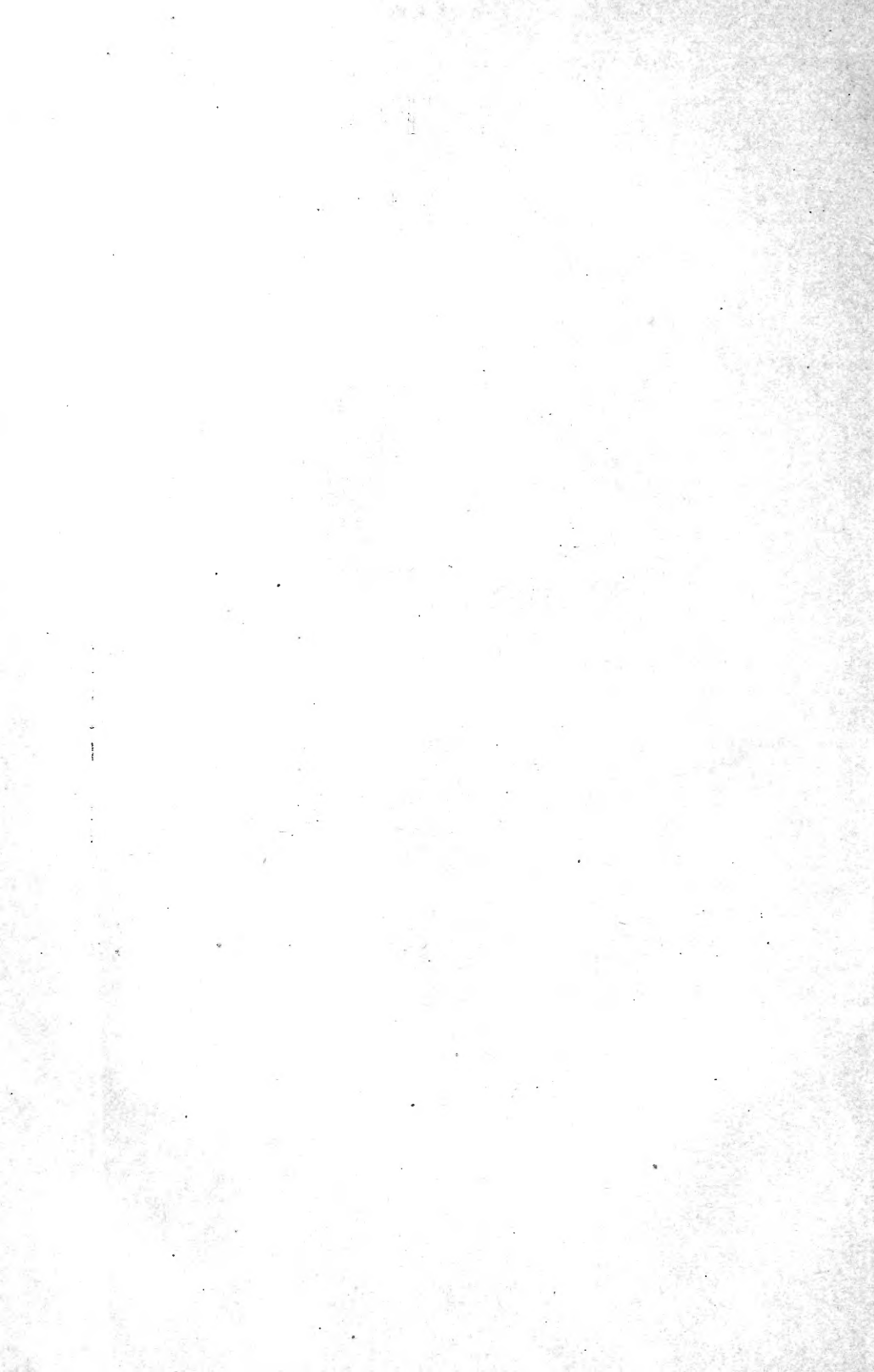
HOW TO RAISE POULTRY



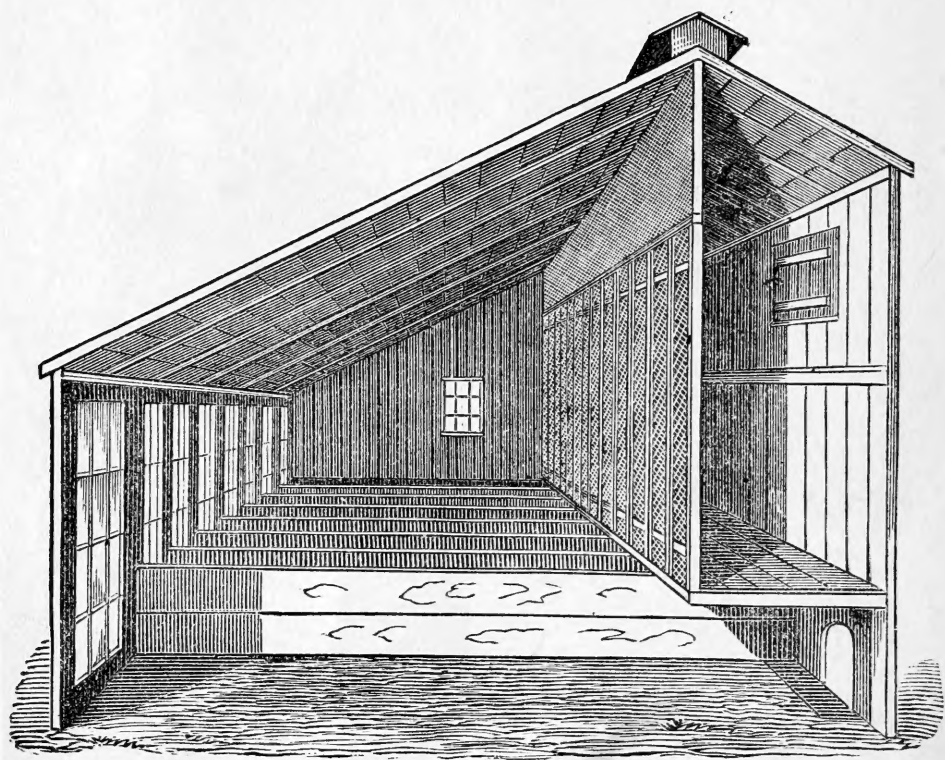
ON A LARGE SCALE.

BY W. H. V.

HARTFORD, CONN.
1880.







HOW TO RAISE POULTRY

ON A

LARGE SCALE;

SHOWING

*PLANS OF BUILDINGS, LAY-OUT OF RUNS,
METHODS OF FEEDING AND TAKING
NECESSARY CARE OF FOWLS*

ON A

POULTRY FARM.

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PREFACE.

The interest taken in the subject to which this book is devoted is now rapidly on the increase, especially here in our own country where many enthusiasts stand ready with capital, but are restrained for the time by unfortunate precedents, waiting only for some one to take the successful initiative, when they will embark at once in the undertaking. The difficulties attending the starting and running of a large establishment, are numerous, and not to be lightly put aside, but are only to be overcome by persistent and studied effort, backed by energy and determination. We submit the following plan of a poultry farm, not indeed, as one perfect in all its appointments, but as one that at least lays some claim to merit, and that if properly carried out, cannot but render a fair return for the capital and labor employed.

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HOW TO RAISE POULTRY

ON A LARGE SCALE.



The signal failure, some years ago of the large establishment under the direction of Mr. Geyelin, at Bromley, England, hushed temporarily the discussion of the subject of poultry keeping on a large scale, and gave rise to distrust as to the feasibility of such an undertaking, even among its most sanguine advocates. At this distant day, one in looking over Mr. Geyelin's treatise, entitled "Poultry Breeding in a Commercial point of view," if he has had any experience whatever in the keeping of fowls, cannot but note the absurdities—coupled as they are with much that is really valuable and original—that stare at one on every page; the evident result of regarding the subject with the aid of theory alone, without that real and thorough knowledge of fowls which is indispensable to success in keeping them in large numbers. The failure of this establishment, made on a basis so fundamentally wrong, and only to be likened to that of the "house built upon the sand," is

not to be in the least considered as a discouragement to further efforts in this direction, but rather as an incentive, inasmuch as it is a wonder that it kept up the semblance of prosperity the little while it did. It simply stands as a warning to after enterprises to shun the artificiality which proved its ruin.

GENERAL CONSIDERATIONS.

No business can prosper unless pursued intelligently and energetically, and the least of all, this. To this calling a man's whole time must be given, and that devotedly. He cannot sit down in his cushioned office, and give orders to others, expecting every little detail, so inseparable from poultry keeping, to be properly attended to by hired help, without further trouble on his own part. He, himself, must be up and doing, and keeping others doing, superintending and directing not only in the daily routine of duties, but seeing to it that everything additional is promptly performed that would in any way contribute to the comfort and welfare of his fowls. In fact, in this business, more directly perhaps than in any other, does success depend on the man at the head of affairs; for with a fair amount of capital to start with, the result, barring everything not to be foreseen, rests virtually with him. His adaptability, or not, to the position, indicates in a great measure the future of the enterprise, for, in the plan chosen, the arrangement and construction of the various buildings, the general system of labor adopted, and numerous other things incident to such an establishment, the character of

the man will unmistakably be evinced if he is at all original.

It is scarcely needful to say that a person who considers fowls as something beneath his notice, and the care of them as unbecoming, and lowering to the dignity of a man, would not be the proper one to run a poultry farm, even if he could be induced to do so.

No book or treatise can be substituted for that real thorough knowledge of fowls that is absolutely necessary to success, and which can be obtained only through experience. Books, when they give expression to the experience of others, are, as such, really valuable, and will render efficient assistance in connection with practical experience—but will not without it. In comparison to the skill and experience required to keep such an establishment working successfully in all its departments, and its stock vigorous and free from disease, that demanded by an ordinary yard is insignificant. In the starting of so large an undertaking, one must begin at the foundation and work it up slowly into a perfect structure, year by year, keeping pace with it the while, in the increase of experience resulting from this growth; for it is safe to say that no one could start such an establishment complete in all its appointments, and under full headway from the very beginning, without previous experience to somewhere near the same extent, and succeed.

The many and various wants of fowls are synonymous with necessities—and no better word can be used in expressing them, nor a better meaning understood in supplying them. Any one want left unsupplied will be sure

to be heard from unfavorably in one way or another. To keep fowls in a natural and profitable condition, self-imposed exercise is required, and this is only obtained by giving them an extensive range, wherein there are shrubbery, grass and plowed ground to engage their attention, and favor their instincts, and not by confinement in small enclosures where there is no living thing, save the fowls themselves, and no incentive to action unless it be to gain their freedom, and for that purpose keep travelling back and forth along the fence to find some opening for their escape. Close confinement soon tells on the spirit and vigor of the most robust fowls; and after the first novelty of their surroundings wears off, the birds stand around seemingly tired and weary of the monotonous life they are forced to lead, and as if they cared not how soon night closed down upon them, and gave excuse for indulging their drowsy inclinations.

It is not sufficient to have runs large; they must also be frequently stirred by the plow, and should be changed yearly to avoid the possibility of becoming tainted. The herding together of fowls in large flocks is productive of much evil, both in its direct opposition to the instincts of the birds, they being accustomed in their wild state to roam around in small flocks, generally under the leadership of a single cock, and also in the increased liability to disease in such an unnatural mob, and is by all means to be avoided.

GROUND PLAN.

The establishment here described, is, in all its ap-

pointments arranged on a scale that will accommodate 3,000 laying fowls, and the chickens that are required to be raised yearly for their renewal; although the plan is susceptible of contraction or extension to any desired size. Let it be borne in mind, however, that with the increase of number of fowls on a poultry farm, the risk of engendering disease is proportionately increased.

In this plan detached houses are employed, to avoid the evil results arising from the gathering together of a very large number of fowls under one roof, and also the ill-shaped and inconvenient runs that such a centralizing system would necessitate. Only enough concentration is employed in the several houses as will render pecuniarily feasible the artificial warming of them at a low temperature, barely sufficient to make them comfortable during cold weather, while there is not enough to increase the liability to disease, the buildings being roomy and kept thoroughly ventilated, as would be the case if the flocks were all allotted rooms in one large general poultry house for that purpose. These houses are located and arranged so that their yards, enclosed by movable fence, may be placed on either side of them as desired, thus giving them an annual change of runs, and leaving the land free for cultivation on the one side or the other every year alternately. By cultivation, all possibility of the ground becoming tainted is done away with, and at the same time the manure dropped by the fowls aside from that within the house, is employed to great advantage in the growing of crops. Ready access is given to all the houses from the side under cultivation, without

any hindrance from fences or gates, as these are all removed to the opposite side to form runs on the land that was under cultivation the year previous.

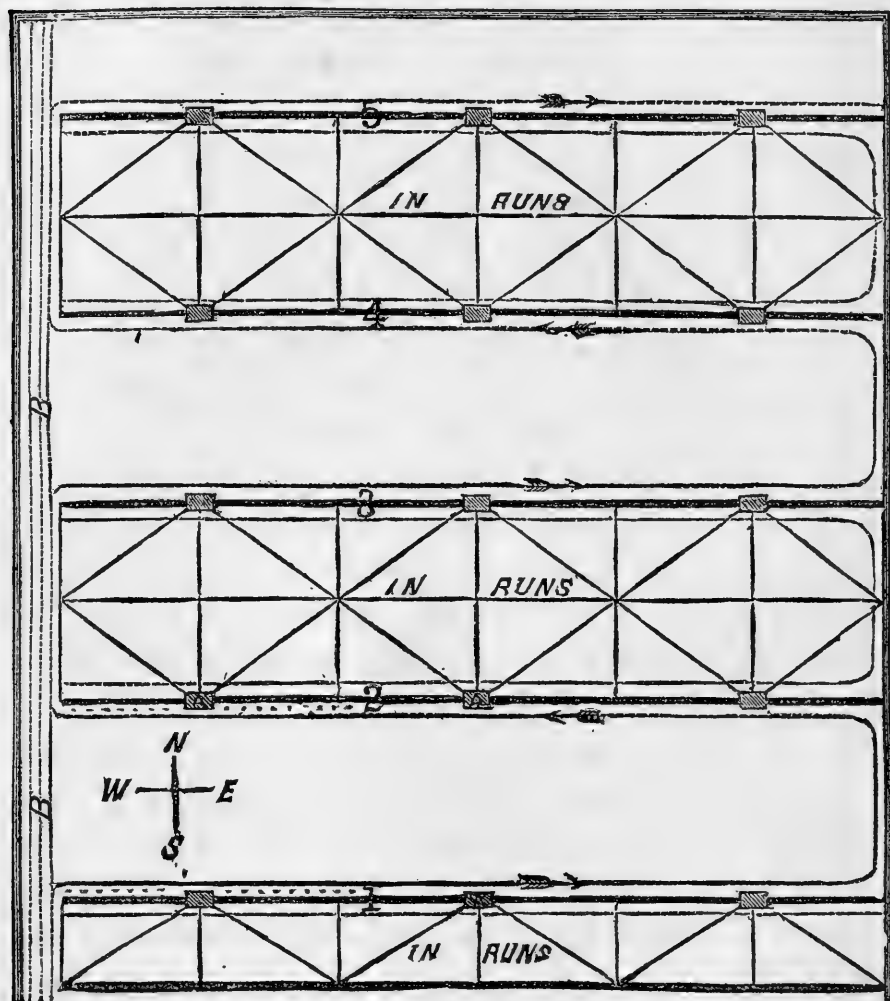


FIG. 1. GROUND PLAN.

The diagram represents the poultry farm proper, exclusive of the breeding yards and houses, nursery, barn, and all other necessary buildings. The houses are represented by the black oblong figures, several of which are

marked A A, and are arranged three in a row, running east and west, consequently facing the south. Of these rows there are five placed 20 rods apart. To each of these houses, placed distant from one another 32 rods in a row, are connected four runs of half an acre each, these corresponding to the four apartments inside each house. The flocks to which these large rooms with their attached runs are allotted, consist of fifty fowls each. The heavy black lines which enclose the whole diagram, and also those running from one house to another east and west in the rows, are to represent stationary fences. The boundary fence is picketed its whole height, simply having a base-board for a rest to the ends of the pickets; while those between the houses are boarded up three feet from the ground, and pickets above that, the boarding to afford protection from the sweeping north winds during cold weather. The fine lines running both parallel with, and also at right angles to the rows of houses, and diagonally across from one house to another, represent the movable fence as employed to divide the land between two rows of houses into runs for the same. Between each two rows there are twelve acres of land, and this is cut up by the movable fence into twenty-four uniform triangular yards of half a acre each, four of these radiating from each one of the six adjacent houses. Since these runs are located first on one side of their houses, and then on the other, alternately yearly, the runs connected with and lying between rows No. 2 and 3, as illustrated in the diagram, and as they are for convenience supposed to be located this year, will be placed

on the opposite sides of those houses next year, on the open land that is under cultivation this year, and will there be met by the runs connected with rows No. 1 and 4, as they are transferred also to fresh ground; while the land occupied as runs this year will be vacated and placed under cultivation next.

These alternate strips of cultivated land intervening, as they of course do between the strips of land occupied by runs, in a measure isolate the fowls in each one of these latter, thus lessening in no small degree the risk of disease attending the gathering together of such a large number of fowls. When the runs belonging to row No. 5, are changed next year to the opposite or northern side of the houses, they will reach to the line or boundary fence situated ten rods off, as does row No. 1, this year on the south. Thus they will contain their regular quantity of half an acre each, only differing from the others in that they are not met by runs still further on.

There must of necessity be a strip only half the width of that between two rows of buildings along the outside of the first and last rows, however far the plan may be extended, to supply room for the runs to those rows every other year, and will of course be cultivated in turn. The dotted lines that run parallel with the rows close along by the houses, and on both sides of them, are to indicate the location of roads. These are traveled by a horse and cart for the distribution of food, water, and dry earth, the collection of eggs, the removal of manure, and for the performance of any other work

in connection with the houses requiring the use of a cart. These roads are permanent, and are kept well rounded up; but only those skirting the strips of land that are under cultivation are used, as they give access to all the houses, the latter having doors on both sides, so being entered equally as well from the road, whichever side the cultivated land necessitates its being. These branch roads all start out from the main road BB, which leads from the cooking and store buildings, and the course that is taken in going the rounds on them at feeding time is indicated in the diagram by arrows. When cold weather approaches in the fall, and the crops have been removed from the cultivated land, the yards are all placed on the south side of the rows to give the fowls a protection on the north, in the shape of their respective houses, and also the stationary fences; these latter affording a warm exposure for basking. In the winter, when the runs are thus placed, the cart in making its trips, goes up on the north side of each row, and turning short about, returns to the main road, instead of going up on the north side of one, and then crossing over at the end, and returning along the south side of the next, as is the order in summer.

Along part of the north side of No. 1, and the south side of row No. 2, between the wagon path and the fence, small dots will be perceived; these, as a sample only, point out the location of chicken coops during late spring and early summer.

The road is used to facilitate feeding the broods, just as with the older fowls. It would be difficult to find a

spot more to the liking of chickens, or one that would contribute in a greater degree, other things being favorable, to their general thrift than this. Here they have free range over the fresh cultivated ground, among the corn, roots, potatoes, or whatever crops be grown, to forage for worms and insects, all of which are very beneficial to chickens, as they supply them with their natural food, and also serve to screen them from the heat of the sun. This plan of cooping the hens and their chicks, not only furnishes the latter with their much-needed insect food, but also in a great measure frees the growing crops of these, their enemies.

BUILDING FOR LAYING STOCK.

There are several essential elements that should enter into the construction of every fowl house. Beyond these the smaller details and arrangements are dictated by convenience, economy and ingenuity. Aside from roof and walls, proof against rain and wind, the building should be so constructed that it can be adjusted to suit the season. In summer the whole house should be thrown wide open to give a free circulation of air, in imitation of trees, the favorite resort of fowls for roosting in warm weather. On an ordinary farm, barring the trouble that is always experienced in inducing fowls accustomed to roosting in the open air, to enter their house on the approach of cold weather, no better roosting place than this which is theirs in a state of nature can be furnished them during this season. But on a poultry farm nature cannot be so literally followed of

course in this respect, but can only be imitated as closely as possible. Too much air cannot be given fowls during summer; even draughts, that at all other seasons are to be so carefully guarded against, add much to their comfort then, if not too direct and strong while on their roosts. How many poultry houses there are in which due provision is made for comfort during cold weather but none whatever for hot, by this turning of indoors into out, but in which instead the air is close, almost stifling, during the heated season, and from which a fowl will instinctively take leave if it has any other resort to which it can go for roosting.

A house that is properly arranged in this respect is quite a rarity, and is the exception and not the rule. With cold weather the house should be tightly closed, provision always being made for free and thorough ventilation. For the farmer or village dweller who does not strive to induce winter laying to any great extent, but only enough to supply his own wants in that direction, a poultry house well and carefully built is all that is required, fowls, feed and care being favorable. Not so with the large market breeder. He should aim to stimulate laying among a certain portion of his flocks during cold weather to an extent that is only natural in the shooting spring, and so take advantage of the alluring and highly profitable prices that rule at this season of the year; and for this, aside from other requirements, a uniformly warm house is necessary.

Provision should be made in a large spacious house by artificial means for the continuation within doors of

an artificial spring, since fowls exposed to the full severity of the weather, are at once, and in most cases effectually, checked in their preparations for laying. This perpetual spring should not be brought about by means that will interfere in the least with perfect ventilation, as by crowding a large flock of fowls into a close building, and retaining the heat generated by their bodies, raise the temperature within to the desired height. This

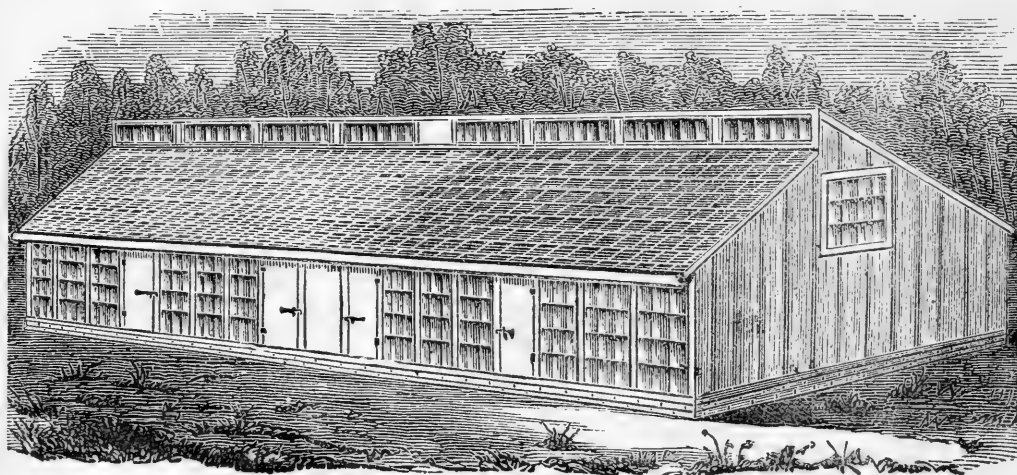


FIG. 2. LAYING HOUSE.

would not do. Heat would be there, but it would be accompanied by the greatest enemy to success: close and foul air. Glass cannot be relied upon to give the steady and uniform warmth that is demanded by a large establishment to insure a favorable yield of eggs, as during winter the sun is frequently hidden for days together, thus rendering the glass for the time being of no avail, as far as heating is concerned. This is also the case during nights. For the small family

flock, the requirements considered, no better, more convenient, or less troublesome mode of providing warmth, to quite an extent, can be employed, when the glass is properly located. When in addition to a large and well exposed surface of glass, the house has also its walls bricked or stoned up and embanked on the outside with earth, or when the house itself is lowered in the ground, it being walled up and carefully drained, the most perfect winter house is obtained, excepting one warmed at a moderate temperature by fire.

In this case the earth renders assistance in warming, and that quite uniformly, while the bricks or stones composing the walls gather heat during sunny days and gradually radiate it through the night. Ventilation from the bottom is not so easily obtained in an under-ground house as in one that is located on the surface and banked up, as from the floor of the latter a small box-tunnel can be carried horizontally to the outer air, so giving escape to the heavier gases that will not ascend to find an opening. The latter style of house, provided it be properly arranged, would be well adapted to fill the requirements of a poultry farm, if it were not for the large original outlay that the masoned walls and the throwing up of heavy embankments of dirt against the same would incur. With a frame house warmed by a stove the original cost is much less. To be sure the money, the interest of which is required to produce this heat, will just about equalize the two in that respect, still it is not capital invested, as is the other, and so is uncalled for; it is taken from the profits of the estab-

ishment, and is simply a requirement on the debtor's side, the same as feed, labor, etc. When this was taken into consideration, and the fact that such a house could be more perfectly thrown open in the summer, and also more thoroughly ventilated at all seasons (in this greatly assisted by the stove in winter), as located on the surface of the ground it can be readily opened at bottom as well as top, and that it would be more easily accessible than a house banked up or one lowered in the ground, it was adapted as the style of building for the general laying and breeding stocks and for the nursery.

Fig. 2 illustrates the exterior of the house for the general laying stock, and is one filling the stations represented by A A, in the diagram, Fig. 1, page 10. In this house provision has to be made, it will be remembered, for four flocks, and that in such a way that the several rooms can be opened on either side, in conformity to the location of their runs, which alternate yearly from one side to the other. To this end the house, which is 20×53 feet is, after deducting five feet for a hall or passage way running directly across the center of the building, divided up crosswise into four apartments of 12×20 feet each, two on each side of the hall. This hall, opening out both sides of the building through wide doors, the one being used next the road travelled, and consequently the cultivated land, is to facilitate caring for, and feeding the fowls, and gives space for the stove and fuel required by the same during cold weather.

The house is built seven feet high at the eaves, inclusive of sills and plates, to allow of a flooring over-

head for a second story. This latter is to afford ample room, and give some chance for exercise indoors during unpleasant weather, when the fowls prefer to remain within. This loft is also partitioned off into four large rooms and a hall, corresponding and connected with the ones immediately below. By this arrangement each fowl is give about ten square feet of surface. This allowance of room, in comparison to most poultry houses, is very large, may be thought by many rather extravagant, still it is no more than is required by fowls in winter for their comfort and welfare.

The frame of this building is what is termed "balloon," by carpenters—that is—it is put up without the aid of mortices and tenons, being simply squared and spiked together. The siding is of dressed pine, boarded up and down, and battened. Shingles are employed as roofing, as they are considered the cheapest and best covering all things considered. The rafters have a pitch of about eight and a quarter inches to the foot, or in other words, there is a rise of seven feet from the plates to the peak. The peculiarity of the roof, the long ridge windows, are formed by extending the north rafters, after that they have met those on the south in the proper place, two feet further on, and then by stud-ding perpendicularly from their extreme ends down to the corresponding front rafters. The sheathing and shingling are carried up the north rafters to their extremities, while on the south ones the roofing ascends only to the base of the upright studs that reach to the ends of the overhanging north rafters. It will be seen that no extra

roofing is required to obtain these windows, as the rafters on either side being of the same pitch form two equal sides of a triangle, the perpendicular window front forming the third. The expense of studding and casing is no more for these windows than for any other, while in comparison to other roof windows, the advantages gained are not inconsiderable. They perform the double office of window and ventilator. In the former capacity they thoroughly light the upper loft without the objection of leakage which is always attached to glass in the roof, unless much pains is taken to render it water tight by painting and tinning, or by cementing. As ventilators they are capable of perfect adjustment to all seasons of the year, in cold weather being merely placed ajar, while in hot weather they are thrown wide open. Also these windows are comparatively exempt from injury by hail, whereas, if lying flat on the roof, they could not escape without more or less damage from such a storm. This, though a matter of too little consequence to be thought about in the construction of a small family poultry house, assumes much importance when large buildings are multiplied on a poultry farm. These windows 8 inches \times 6 feet, are hinged on their upper sides, and in opening are shoved out at the bottom. A flat narrow strip of iron, 18 inches long, one end of which is fastened to the lower part of the sash, serves to keep the windows where placed, by slipping one of the several holes punched at short stages along its whole length, so as to regulate the opening, over a peg projecting from the windowsill.

The front or south side of the house is glazed, save the space occupied by the five doors, one opening into each of the four rooms and the centre one into the hall or passage way. The former are to afford direct communication between each room, and its respective run the alternate years when situated on that side, and for convenience of removing manure and for introducing dry earth, when the opposite side is obstructed by yards. On the north side, not seen in the illustration, are five doors corresponding, and directly opposite to those on the south, to be used for the same purpose. The glazed front is divided into twelve windows, 3 feet \times 6 feet each; three of these windows, and the accompanying door forming the front to each room. Both the upper and lower sash slide, and are kept where desired, by small drop catches (no springs), such as are frequently seen on car windows. A small window 2 \times 2½ feet that slides sideways, opens into each of the lower rooms on the north side. These windows are intended mainly for the better airing of the house in summer. The windows, 3 feet square, in the gable ends, one in each, are hinged on the side, and open outwards. When opened they are hooked fast to prevent slamming. These windows in warm weather, by the draft that they create through the loft, add much to its comfort. Frames of coarse wire netting on the inside, serve to protect the windows from breakage, and in summer when the latter are open to prevent fowls from flying through.

In the interior of the house, both up stairs and down, the several rooms and the halls are partitioned off

by light slat work; the strips that are used for this purpose being two and one-half inches wide, by one-half an inch thick. Wire netting, though much prettier, and less obstructive to light, is far too expensive to be used thus freely, in such large, and so many houses. The doors, above stairs, and below, through these partitions, leading from the hall into the two adjacent rooms on either side, and from them into the end apartments, are directly in the centre of them, and are likewise of slat work. An open stairway two feet wide leads from the lower hall to the upper one. The fowls in each set of rooms, composed of one each above and below, have their own stairway or ladder. These ladders eighteen inches wide, to allow of fowls passing one another on them, starting below from small platforms two feet high, close along side the partitions, ascend gradually to the upper floor.

The roosts are arranged in the loft under the south slope of the roof. They consist, in each room, of a frame work formed by spiking, eighteen inches apart, three 3×4 scantlings, slightly rounded on top, and eleven and one-half feet long, on to side or end pieces of the same, five feet long, the back ends of these latter being fastened to the rafters at a point two feet from the floor, by heavy strap hinges, and their front ends resting on cleats fastened to the side partitions the same distance from the floor. When in cleaning the floor, or doing any other work in which the roosts are in the way, the latter are lifted against the roof, and hooked fast. To assist in removing manure from, and introducing fresh earth into the loft, there is a hatchway

in the floor of the upper hall, through which loaded baskets are raised and lowered by means of a small tackle fastened to a pair of rafters overhead.

The nests, which are on the first floor, are arranged three tiers high, eight in a tier, against the north side of each room. Each nest is twelve inches deep, and thirteen inches wide, in height twelve inches. Those employed in the houses occupied by the sitting breeds, will be illustrated, and explained hereafter, in connection with incubation. Small trap doors for the use of the fowls, and which the artist has failed to represent, are in the bottom part of the larger doors on both sides of the house. The building rests upon a foundation not only well sunken in the ground, beyond the reach of the frost, but also raised several inches above its surface, so allowing the ground within the house to be raised above that without, for the sake of dryness. Cement forms the flooring below, but is kept covered with a coating of dry earth three inches or four inches thick. Eave troughs are employed on these and all other buildings on the farm, nor is any hen house complete without them, nor has its owner done what he could for the comfort of his fowls, till he has provided them. The exterior of the houses are kept well painted. This is true economy with all buildings.

BUILDINGS FOR BREEDING STOCK.

To make substantial and gratifying progress in the breeding of stock, or to retain desirable qualities once gained, careful selection and proper mating for the objects in view must be observed.

As fowls, from the shortness of their generations, are susceptible of much improvement and transformation in both useful and ornamental qualities in a comparatively brief period, so are they liable to degeneracy quite as fast when neglected and the requisite precaution withdrawn. Were the eggs selected from the general laying stock, the eggs themselves being the only indicator of the character of the embryo chick within, doubtful indeed would be the product and seldom satisfactory. Penning has to be resorted to to attain the desired ends with the greatest certainty and the least trouble.

In this yarding of the breeding stock, from six to nine hens are allowed to a single cock, the number varying with breed, age, and vigor. To each pen is allotted a room 6 × 11 feet in the breeding house, illustrated in frontispiece. Provision is made in connection with this house, as well as with those for general layers, for transfer of runs. More important, if possible, is this change with the breeding stock than with the laying, as unexceptional care in keeping healthy the former, concerns also the latter—their product. Heretofore no house, divided up for several breeding stocks, has passed under my observation in which provision was made for the changing of the runs connected with it, at the option of its owner, so compelling the restriction of the fowls to one side year in and year out. To be forced to enclose breeding stock—your best and finest—in a fenced run is, at the best, unsatisfactory, and so every opportunity should be embraced that will improve and ease their condition. This ability to change runs is

furnished in the accompanying plan of house; at the same time a passage-way, so indispensable for the proper, expeditious, and comfortable caring for the fowls is employed, and that too without the sacrifice of an inch of ground-surface. This hall or passage-way, running along the back side of the building, is elevated—as will be seen by referring to illustration—two feet from the floor, thus spanning across each room, leaving its entire surface unintruded on, and giving exit to the fowls, when so wished, on the back as well as front side. The width of said hall is two feet six inches, and height from its flooring, which consists of one and one half inch hemlock plank, to the plate or eaves six feet. Its front, the side next the fowls, is enclosed by slat-work, through which slat doors open into each pen or room. The partitions dividing the house up transversely into eight equal sized rooms are of similar slat-work, above the base boards which are two feet high, to prevent the fighting of neighboring cocks. The dimensions of house are 48×11 feet on the ground, 5 feet high at front eaves, 8 feet high at back eaves—2 feet below flooring of hall, and 6 feet above—and $9\frac{1}{2}$ feet at ridge or peak. The siding is of dressed pine, battened. The roof is shingled and its summit capped with an extended ventilator running the whole length of the ridge. The windows in front, one opposite each pen, extend from the ground to the plates and are movable in each sash. Here let me mention that the glass employed in the several buildings is not of the first quality, but such as is termed “blistered” or “wavy,” and can be procured much

cheaper than, while answering the purpose equally as well as perfect glass. In each gable end a large glass window is located; these in summer greatly assist in airing. Three shutter windows open into the back of the passage-way and are solely for ventilation. The heater occupies one of the middle rooms, into which room doors open on either side from without. The nests,—light, detached boxes, fourteen inches square, in height the same, are placed on the floor facing the sides of the room. A single scantling, rounded on top, constitutes the roosts in each apartment. It is placed two feet from the ground and a foot from, and parallel to, the partition. Underneath each roost, and six inches removed from it, is fastened a broad board as a drop for the manure. The small hen doors both in front and rear, sliding up and down in grooves, are raised and lowered by means of cord and pulley from the hall. The whole house is well though cheaply built. The runs, eight in all, of one-eighth of an acre each, enclosed with movable fence, radiate from the building on the one side or the other as the case may be. Of these breeding houses, there are four, all located in a row. And these and their runs, subject to road, cultivation, etc., are as the houses and runs for layers. The stationary fence running east and west between the adjoining houses is on a direct line with the center of the doors opening at the ends into the passage-ways. The last or end lengths of this fence being movable, the rails resting in slots, veer off to one side or the other of the door as the cultivated land necessitates, in this way, by proper adjust-

ment, giving free access to the door on whichever side desired.

SELECTION OF BREEDS.

The excellency of the fowls with which a poultry farm is stocked, is a matter of great moment. In fact, where buildings, range, food, etc., are provided in conformity with their health, comfort, and nature, success quite centers on the quality of the birds. A poor or indifferent layer will barely produce eggs to balance her keeping, while the extra three or four dozens resulting from a superior hen constitute the profits; the quantity of food consumed by the two being equal, care being the same, and nature not being violated by overcrowding, comparison between two individual hens, bad and good, is also a safe comparison when the number is multiplied.

In selecting breeds with a view to stocking a poultry farm, "sitters" and "non-sitters" should be pretty evenly balanced. If, however, early chickens are not desired, the "non-sitting" persuasion may predominate slightly. Of the "sitters," Brahmas, both Dark and Light, Dominiques, and Plymouth Rocks, are to be preferred. The quiet, contented disposition, great winter-laying qualities, and exceeding hardiness both as adults and chickens recommend the Brahma in the strongest terms to the poultry farmer. The Dominique, a fowl which from its general dissemination throughout the country, is looked upon by many as only a higher order of dunghill, but which was really imported in the early history of our country as a distinct breed, from continental Europe,

possesses many valuable qualities, not the least of which is surprising hardiness; owing doubtless to their long and thorough acclimatization. The ideal market and table fowl in this country is undoubtedly the justly popular Plymouth Rock. Owing to the excessive sitting propensities of the Cochins, these fowls are not just the thing for a poultry farm, and the Dorking, so popular and common in England, is not suitable for our climate—at least does not sustain the reputation with us that is universally conceded to it at home, while the Game fowl is rendered entirely valueless for our purpose by its pugnacious disposition. Our choice among “non-sitters” is unhesitatingly Leghorns, white or brown, and Houdans. The latter are an excellent table fowl—maturing early, as do also the Leghorns, while both are superior layers. Of the other “non-sitting” breeds none are so well adapted to the wants of the poulterer, as all seem more or less predisposed to colds and roup; while even the Houdans and Leghorns are not absolutely free from its visitations.

But however prolific layers, of whatever breed, may be the occupants of well regulated yards, judicious and studied feeding is requisite to the full employment of their powers,

INCUBATION.

The contingencies attending chickenhood through all its stages, from first conception till full maturity, are too numerous and multiform to allow of any blunders of either omission or commission in care during a single

period. The old adage, warning you not to count your chickens "before they are hatched," might with fitness be stretched to "until they are grown." With the selection and mating of the breeding stock the work begins. Vigor here is of paramount importance, for however perfect a chicken may be in all other respects, without a good constitution it is a failure. Careful conformity in the number of fowls composing a breeding-pen is to be sought as to the season; winter and early-spring not admitting of more than half the number of hens with a cock that would later in the season be none too many; also, as to breed, size, and age, and not unfrequently, individual "crinks and cranks," especially in the cock. Such things being nicely weighed, and the care and surroundings of the fowls being such as to promote health, the eggs will, almost without exception, prove fertile, and thus the first difficulty to be encountered in chicken-rearing successfully overcome.

During incubation, risk is run, especially on a poultry farm, unless perfect system is employed. The construction and location of the nests so as to afford complete protection to the inmates from intrusion is indispensable. Were no especial provision made for sitting, eggs simply being placed under the broody hen in the ordinary nests, the result would be most discouraging,—a decided failure. Each nest thus set would become public property forthwith. A hen wishing to lay would take extra trouble to crowd in with one sitting and deposit her egg. No other spot would quite suit her fancy. Also, one becoming broody would instantly be-

take herself to the nest of a sitter, and without stopping to ask whether she would like to go "snooks," step in and claim half. The occupant remonstrating, a scuffle would ensue, resulting in the breakage of at least two or three eggs, and in a final compromise. Nor could a legitimate sitter leave her nest without unfailingly finding it appropriated on her return. "Confusion worse confounded" would reign. This lesson experience has taught indelibly.

There are several ways of isolating sitting hens, any one of which is far preferable to no protection, still among which there is a decided choice. One, that of removing broody hens from the laying houses, and allotting to each one a small pen or room, three or four feet square, in which is placed the nest, also dust-bath, water, and feed-fountain, in a large sitting-house, though answering the purpose as far as seclusion is concerned, has its drawbacks. In the first place, this necessitates the removal of the hens from their accustomed nests,—an operation to be avoided, when it may be as easily as not, though when the fowls in question are Asiatics, and the attendant quite gentle and well-versed in their care, it is quite generally accompanied with success. Also, the hens thus placed seldom take the necessary exercise, rarely leaving their nests, while the greatest objection is that of the extensive additional buildings needed. Another plan is that of confining hens closely to their nests, and daily removing them by hand to small feeding-pens, and after allowing them sufficient time for eating and dusting, return them again. This involves much labor, and

unless the hens be exceedingly quiet and docile, risk also. Still a third system might be employed. Let the hens be removed to a sitting-house and placed on nests arranged along the sides, each hen being confined to her nest by means of a frame of wire netting fitting over its entrance. Feeding time at hand, remove the frames from the front of a few nests at a time, and after the inmates have returned, replace the frames and remove others, going through the same process till all be cared for. While this latter is to be preferred to either of the above, it still has its weak points. The objects being to shun the expense of extra buildings and the removal of hens from their wonted nests, while also caring for them with the least possible handling, and expenditure of time and labor, the following plan is deemed preferable to either of the foregoing, and the one best meeting these ends.

The nests as illustrated in the Fig. 3, are those employed in all the laying-houses occupied by the "sitting" breeds, and can be easily converted into sitting-nests as wanted,—one or more. These nests consist of a single row three tiers high, and are open on both sides, having no stationary backs, but instead, a small frame of wire netting buttoned over one opening of each nest, and constituting a movable back. They are located on the ground or lower floor, one set of course, to each apartment, a little back of the center of the room, and extending across it, with the exception of a space of two feet, left as a connection between the two parts of the room. Each nest is fifteen inches square,—

in height eighteen inches,—five of which is for earth under the nests. Of these nests there are twenty-four,—eight in a tier,—three tiers. The front or face strips that run along both sides of each tier, holding in the earth and straw, are six inches high, and are fastened to every alternate partition-board by screws, so that, the sitting season being over, they can easily be removed to facilitate cleaning out the nests. Also, alighting boards, eight inches wide, pass along both sides. In the passageway, left between the end of the nest-frame and side of the room, a slat door is hung, which is closed across the passage when the sitters are being fed. Likewise, the space above the nests, between them and the ceiling, is slatted, so that when the door is closed, a complete partition is formed across the room. It will be observed that the top or cover of the third tier of nests has a double pitch, from the ridge of which the slat-work ascends. This pitch is to prevent fowls from employing it as a roost.

On the approach of the sitting-season, the nests, that during the rest of the year open in the row, first one on one side, and the next on the other, alternately, are all made to face the south by the transfer of all the wire frames to the north side. As soon as a hen becomes broody, her nest having been duly prepared by placing in the bottom several inches of fresh earth formed into a very slight hollow, on which is spread a light covering of soft mashed straw, or better still, leaves, and eggs placed within, a second frame of netting is buttoned on the front or south side of the nest. The

hen is thus completely enclosed on her chosen nest, while all intrusion on the part of other fowls, also, from the fineness of the wire mesh, of rats and weasels, is rendered impossible. From what has been already said it is scarcely necessary to state that all hens are thus treated on being set.

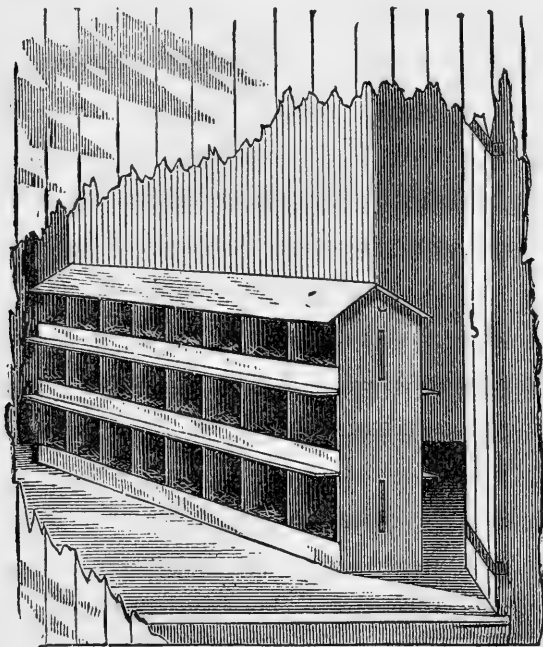


FIG. 3. NESTS.

Feeding time for the sitters having arrived, the attendant passes to the north side of the nests through the door left at the end of the tier, closing it after him, thus effectually shutting out from the north side of apartment the laying hens. Then food and water being provided, he removes the wire frames on that side from the nests of half a dozen sitters,—never more at once and they well scattered about in point of location,—and

withdrawing, leaves these to their eating and dusting, while he, in turn, steps into each of the other apartments of the building, going through the same process, and then on to the next building, performing the operation as in the previous one, and so on. At the end of fifteen minutes, or thereabouts, he again makes his appearance at the starting point, shutting into their several nests the sitters let out, and giving liberty to as many more. Thus, replacing the wire frames and removing others he goes through all the apartments of the several houses in strict order, till all the hens have received his attention. When the feeding has been accomplished, the hens being securely confined to their nests, the door in each apartment,—the closure of which forms these temporized feeding-rooms,—is again thrown open, and the general flock once more placed in full possession of their room.

In almost every instance, the hens will have all returned to their nests at the expiration of the fifteen minutes, but occasionally a loiterer will be met with who has to be picked up and returned by hand. In this operation great gentleness must be employed, and the fowl simply placed on the alighting board in front of her nest, she herself entering. With systematic care, little trouble need be experienced in the working of this plan, the hens, with but few exceptions, returning each to her own nest. As a sure index for the attendant as to the belongings of each hen, they have marked on them with paint, on being set, small figures corresponding to others placed over their nests, the number of the figure indi-

cating the nest in the row, while the color of the paint points out the tier, three different colors being employed for three tiers. The earth placed under each nest occupied by a sitter is moistened twice a week from the spout of a watering-pot (the sprinkler removed), passed close around the outside of the nest. This mode of managing the sitting department is one that is eminently adapted to a family fowl-house as well as one on a poultry farm, and if properly carried out, the eggs being well fertilized, will insure success in this, to many, most difficult stage of chicken-bearing,—incubation.

REARING.

Each year, from the chicken runs, must be sent forth pullets numbering half the laying fowls, to fill the vacancy caused by the older half—two years past—taking their way market-ward, if the best results are to be attained.

The country over, mismanagement and neglect, in a greater or less degree, is too commonly the portion of chickenhood. The result,—a dwarfed, as compared with what proper food and care would make it, and unprofitable growth. To mention the more prominent causes conducing to growth failure, will be to indicate the conditions of success. A common custom, that of taking the chickens from the hen as fast as hatched and placing them by the fire, is the first matter calling for censure. To be sure, there are occasional cases when it becomes necessary for the safety of the chickens to remove them, owing to much irregularity in hatching, or some

other exceptional circumstance, of which many appear in poultry keeping, but otherwise they should be left undisturbed.

At this stage they require quiet and the strength-giving warmth of the hen. For the same reason, if all are doing well, the mother and her brood should not be hurried from the nest, but allowed to remain twelve or fifteen hours, only care being taken to remove cast-off shells. To prevent restlessness on the part of the hen, a feeding of corn, also drink, should be given her on the nest. The chicks, however, require and should receive no feed till removed.

Again, too frequently, the diet of chickens, and all young poultry in fact, consists solely of fine corn meal; and this repeated, feeding after feeding, and continued from the very first meal till growth carries them to a point where whole corn can be consumed, when the latter is substituted. Many, from false ideas of economy, delude themselves into the belief that corn (meal and grain), and corn alone, constitutes the cheapest poultry food for both chickens and adults, because, weight considered, its market price is the lowest. They are far astray, however. Such persons do not take the *result* into consideration. If they did, they would arrive at a different conclusion, as chickens analyze the grain fully as well, practically, as would the chemist. In nitrogenous matter, an element that enters so largely into the composition of bone and muscle in the growing chick and the egg of the laying hen, corn is deficient—its value as food consisting rather in its fattening qualities. Owing to

the oil it contains, it is heating in its nature, and consequently, though desirable in cold weather, is to be avoided in warm. Nevertheless, no variety of grain, however well embodying the requisites of chicken food, can be solely employed to the greatest profit. The diet needs to be an extended and varied one. Hard-boiled egg, constituting the feed for the first day or two, should be succeeded by an admixture of coarse corn meal, oat meal and wheat bran. Wheat middlings and ground buckwheat ought also at times to figure in the diet, taking the place of some of the other grains. A crumbly state is the only proper one in which to give soft feed, it being mixed to that consistency by scalding water, better still, milk, if obtainable, and given during spring, while yet warm. An excess of moisture in food, aside from all other objections, has a tendency to cause diarrhœa.

As soon as chickens can readily appropriate the smaller grains, they should receive a small portion daily, the quantity being steadily increased, until at length, the soft food is entirely supplanted. All the different varieties of grain, including corn "cracked," may be fed to advantage, and should be, to a certain extent, to afford a change.

But the demands on us, when we would thus assume nature's office of provider, are not all to be met by grain. An equivalent has to be given for insect food as well. This is best furnished in the form of refuse meat or liver chopped fine. Also, green food should, unfailingly, be supplied. This, in the absence of a grass plot, which is greatly to be preferred, must be provided by

the introduction of finely-chopped grass into their soft feed, or by the use of cabbage, if early in the season. Water is, of course, needed,—pure and frequently renewed. Milk, however, abounding as it does in growth material, is greatly to be preferred to water as a drink, and for the first few weeks at least, if reasonably obtainable, should be employed as such. In the case of the larger breeds, ground bone mixed in their feed will be found of great assistance in growth, correcting any tendency to leg weakness. Though all requisite food be provided, with the mode of giving it practiced by many, its otherwise good effects would be nullified. Three times a day, regardless of age and in overdoses, is no *proper* way of feeding chickens, though it *is* the common one. In quantity it ought to be only as much as will be readily eaten up at the time, and should be given early and late and frequently through the day. Let none be suffered to lie around, as in that case it speedily sours, and the chickens refuse to eat, and also from its constant presence their appetites are dulled. As the chickens grow older, the feedings need not be so frequent.

Instead of being allowed the liberty to drag her brood through the drenching morning grass, the hen should be constantly confined to her coop,—when the chickens will take what exercise they wish and no more. The style of coop matters little so long as it is rain-proof, roomy, and comfortable, and can be closed at night to exclude vermin. Perhaps the ordinary tent coop is the best, supplemented by a movable bottom and a

night door, hinged on its upper edge. The bottom, used only at night and during wet weather, needs cleaning daily, and the whole coop ought to be occasionally moved its width on to fresh ground. When the hen deserts her brood, a short bit of joist with upper edges slightly rounded off may be placed on the floor of the coop and will provide the chickens with a roost. Sun is indispensable in all animal growth, and especially so in poultry, but in the height of summer, shade is no less important. I have in my mind at least two instances where young broods perished from heat when confined, through carelessness, under the direct rays of the sun, without chance of escape. I need not carry this further, only to remark that when restricted to her coop, the hen is of course, helpless to procure aught for herself or brood, and consequently, when neglected, both old and young invariably suffer,—likewise the pocket of their owner. If viewed in this latter light more generally, poultry would doubtless be better cared for, as there are those who calloused to anything like commiseration for brute wrongs, feel the same with surprising acuteness when made aware of them *via* their pocket-books. On a poultry farm, system must be employed in the caring for, feeding, and housing of the chickens as well as the adult birds.

For early chickens extra provision has to be made in the matter of housing, ordinary coops being insufficient for the season. An illustration of such a house is unnecessary,—its construction being simple. It is sixteen feet in width, while in length it must conform to the

number of broods to be housed. Two feet is the height at the eaves; the roof having a double pitch, eight feet at the ridge. The whole south slope is glazed with with hot-house sash. Inside there are no stationary fixtures, but the whole room is open and clear. The floor is of earth; while, as a protection against rats, there projects outward from the bottom of the foundation underneath the ground a single layer of brick, twenty inches wide. Around or under this, rats seldom burrow. Earth is sought as a flooring for chickens owing to its unquestionable superiority over either cement pavements, or wood. No coops are employed within the house, but, instead, wired pens. These are arranged in two rows, one on either side of a long centre passage two feet wide. Each pen or run for a hen and brood is in width two feet, and extending from the passage to one side, is consequently seven feet long. To go to work to form these pens out of the open room, two sizes of frames of wire netting are required, the mesh the same in both, one half inch, to prevent the chickens passing through,—one size two by seven feet, the other two by ten feet. Of the former, two are needed to each pen, one as a cover, the other as a side or partition, while of the latter only one is needed to every five pens, as it forms their ends next the passage. These last-named, or passage frames, have double cleats placed across them on the inside, every two feet in distance, as has also the corresponding side of the building, so that the partition frames have to be simply slipped down between these grooves, and every alternate one hooked fast at both ends, and

the pens are complete, excepting covers, which are hooked on. Small wire hooks are the ones used. Several shovelfuls of sifted coal ashes or of fine earth are thrown into each pen, and a drinking vessel hooked into the mesh, when all is ready for occupation. Cleanliness must, of course be observed, and thorough ventilation. The season over, but a few moments are required to remove the frames, when the building is free for some other purpose. Besides the heat from the sun, the rays of which, owing to the lowness of the eaves and height of the peak, penetrate every corner of the house, the pipe coming from the cooking stove in the adjoining room, carried the whole length of the building, is adding to its warmth.

Owing to the molding influences of the centuries of domestication through which fowls have passed up to the present, primitive nature has, in many particulars, given away to one more modern and more in consonance with the change time through man, has wrought. Especially is this the case in matter of food, and by as much as present prolificness exceeds normal, or present size original, by so much must the quantity and quality of it now, surpass that of which nature was the purveyor. *Over-feeding*, however, is one of the most frequent causes of failure, especially among novices, a majority of whom "want their fowls to have all they can eat," thinking that, in thus acting, they are treating them most kindly. The egg organs always suffer when hens are fed to repletion, and not unfrequently does this fattening lead to the irretrievable loss of the egg-producing

powers. Appetite is the only gauge, and when enough feed is never given to quite satisfy it, prejudicial fattening will be avoided.

In our manner of feeding we might imitate nature, with undoubted advantage. In its daily wanderings the wild bird gathers its food, a mouthful here and another there,—its crop seldom filled to repletion, yet as seldom entirely empty. Constant exercise is thereby obtained and a variety of food partaken of, slowly and at all hours of the day. In a great measure, the beneficial results accruing from this can be secured to poultry under restriction at the present day. It is but a simple job, by means of one of the larger hand-drills, to bury daily their allowance of grain five or six inches under ground, the right quantity having been ascertained beforehand by feeding on the surface as a trial. Any drill now manufactured, has to have its foot or plow set lower, its hopper much enlarged and its feeding apparatus set to its full capacity. One simpler and better adapted to this feeding purpose might easily be constructed. The first few times of feeding, some difficulty will be experienced in running the drill to the depth mentioned, but if one spot be set apart as a feeding-ground and that high and dry, owing to the combined agencies of drill and fowls' feet in scratching, it will soon become perfectly mellow. These ends of exercise and slow feeding have to be sought differently in winter, as, of course, drilling is no longer possible. Happily for the carrying out of this style of feeding corn (that owing to its fattening and heating tendencies ought not

to be fed to any extent, during the warmer portion of the year), in cold weather should figure quite prominently in the diet, and then being fed on the ear, meets these wants to a degree. By building a small wire-slatted rack with cover, along one side of the coop, elevated from the floor high enough to cause the fowls to stretch some, if not to hop up, to reach the ears of corn placed within, still more exercise would be compelled, and to advantage. Grain, other than corn, must at this season, be fed on the floor or else on the ground without, when the weather will permit. This enforced exercise and slow and prolonged feeding, aside from its direct beneficial results, which are by no means small, of necessity, makes employment incumbent upon the fowl, and the dulness and indifference that frequently possesses them, when fed at stated meals, is at once broken up and with it a fruitful cause of diseases, feather-eating, egg-eating, etc. With fowls, as with more pretentious beings, "idleness is the mother of mischief."

Of course, only grain can be given in the above mentioned way, and as soft food has been proven to be of great value in poultry feeding, under certain restrictions of time and manner of bestowing, it should be recognized in the diet. Morning is the proper time for feeding it, as cooked or scalded meal affords nutriment sooner than hard grain; and the manner by throwing it while yet warm—in winter quite so—on clean, hard ground, in favorable weather; otherwise, within doors, in a trough. As in chicken-feeding, it should be mixed quite dry, and for the same reasons. All the

several varieties of meal should be embraced in this diet; but two or three, however, being employed together. Corn meal should figure in it much more extensively in cold weather than in warm,—and wheat bran, the value of which, as an egg-stimulator, is not generally appreciated, ought to find place in the mixture, the year round.

As a light noon-day meal in winter, small potatoes, boiled and mashed up with bran or buckwheat meal, and fed warm, are excellent. During the tillable portions of the year no distinctive noon meal should be given, as the evening feed of grain ought then to be considerably increased so as to partially make up for a second meal, and drilled in very early in the afternoon, when the fowls will be engaged in unearthing it until night-fall. A fair amount of seasoning, both of pepper and salt, ought to enter into all the soft food, and in cold weather the amount of the former can be considerably increased, with benefit. The hard grain fare should be a changing one,—all the various cereals having their turn. Several varieties may be drilled in together, but never in surface feeding would I employ more than one, as a number only causes continual contention and rushing among the fowls, they always having a preference for one variety over another. Wheat, if obtainable at anything approaching a reasonable price, forms one of the very cheapest of foods, though in winter, doubtless, to buckwheat is to be given the choice. The great avidity with which fowls consume broken oyster shells and other calcareous matter, of which they have been

deprived for some time, shows their necessity for this material. The demand for animal food has to be met by cheap refuse meat, and cleanings from fish-markets, and if in the vicinity of milkmen, "bob-calves" will furnish a supply. An establishment, located near the sea shore, could resort to menhaden and other inferior fish, that are caught in large quantities. As a general thing, all flesh ought to be boiled before being fed. A supply of green food is easily obtained, where there is an annual change of runs, for each season after the coops have been removed from the cultivated land it is seeded down with a heavy coating of grass-seed and a light one of wheat, and so when occupied the following spring for runs, first the wheat and after that the grass furnish "greens." Cabbages and sugar beets have to be resorted to in winter. Fowls appreciate pure water more than is imagined, and a supply should be kept constantly before them.

But little trouble need be apprehended from lice, if only proper precautionary measures be taken. To this end, all padding with mats, straw, and other materials, must be foregone, and all arrangements within the house be made as simple as possible. Let the whole interior of the house be thoroughly whitewashed several times during the year—done so by "sloshing" the wash into every cranny and crevice till full. The nests must be kept clean and a small allowance of sulphur left in the bottom of each. Avoid any considerable deposit of manure; and a large, deep, dusting-bath—consisting of dried earth, finely sifted ashes, and a small quantity of sulphur—

being provided the fowls, lice may almost be defied. Carbolic acid is also of assistance — likewise occasional fumigations.

As a change of surroundings proves the most effective way of breaking up a sitter, a run with an open shed, provided only with roosts, should be set apart on a poultry farm for the reception and care of all such cases. During the season when this state of things exists, the wagon with a crate placed on it, should make datly rounds, and all hens broodily inclined, that are not wanted as sitters, ought, after having the number of their flock marked on them with paint, to be crated and removed to said run, where they remain till recovered, when they are restored to their proper flocks. The secret of breaking broodiness is to take it in hand on its first appearance. For the completion of comfort, shade is quite a necessity during the warmer weather in immediate proximity to the houses—in fact overshadowing it—and this is best secured in deciduous trees, as in winter their naked branches offer no obstacles to the sun's rays. Evergreens should be located more removed from the building and will act as wind-breaks at the latter season. Dependence has to be placed on young fowls, however, to reap the full results of the most favorable circumstances; and for a constant supply of winter eggs, early hatched pullets are a *sine qua non*, though in the case of Brahmas, hens, when hatched, early, often make fair returns. By at least a limited variety of breeds and a succession of broods, there is little difficulty in securing eggs during every month in the year.

MISCELLANEOUS BUILDINGS.

The buildings immediately occupied by the fowls do not complete the outfit of a proper establishment. Others are needed. Of these, one of the most essential is a granary. The fluctuations in the grain market, and the great advance in prices from the cargo purchase—as it passes through the hands of the burdensome middlemen up to the retailer; and less, although still appreciable, to the average wholesale dealer—are to interest the poultry farmer. He cannot, under average circumstances, grow his own grain, and so, being thrown on the market, he becomes a large purchaser. Reason dictates that a small dealer would not be resorted to for this supply, but instead, one would evade, as far as practicable, these expensive go-betweens, and approach nearer the producer. Here, at the East, grain would be bought by the car-load, brought from the great West, while in sections more remote from large centres, the farmers would gladly furnish any quantity direct. More than this, to make the best purchases, the market must be watched, and its depressions taken advantage of. By purchasing thus largely and, as near as possible, directly, and that, too, at the right time, a great saving would follow. To realize this, though, the granary at home must be commodious and well appointed,—roomy, to give storage to large quantities at once; properly arranged, to preserve the same from heating.

Circumstances would regulate the size, but a two-story building would, doubtless, be the most desirable form. If ground could be had favorable for a drive-way, such

should lead to the upper story. This failing, the next best means of elevating the grain would be by tackles, with the ropes attached to a platform, capable of holding several bags at a trip, and worked by a horse, in like manner as a hay-fork. The real feature of such a building, however, should be the arrangements for the thorough airing of its contents. To this, other considerations should be quite subordinate, perhaps properly reserving vermin-proof arrangements.

Satisfactory ventilation, I imagine, will result from the adoption of a plan similar to the following: Let a passage-way of at least six feet in width traverse the two stories, through the center, lengthwise. Along either side of these arrange the bins, extending back to the siding. The front of these, facing the passage, should consist of loose boards, slid between cleats, the backs of the bins to be ceiled up on the inside of the upright joists, as usual. These uprights, however, to which are nailed the ceiling within, and the clapboards without, are not to be the customary 3 × 4 joists, but instead, two-inch plank, ten inches wide, set crosswise. This vacancy of ten inches, formed between siding and ceiling, is to communicate with the outer air through ample openings, guarded by fine wire mesh, at the bottom next the sill, and above, directly under the eaves. To bring in contact with the grain the air thus circulating against the back of the bins, the latter protected the while from rain and snow, let tin pipes, of the size of ordinary water leaders, thickly perforated with small holes, pass directly through the bins from this sheltered air passage

to the front side, where they open out into the room. These pipes should be well scattered throughout the mass of grain, the required number being easily ascertained by experimenting. When the grain is being removed, these pipes should be taken out as fast as the grain lowers to their level, so as not to interfere.

For unshelled corn, the end or corner bins had best be reserved, as by the slatting of both the rear of these bins, in place of the ceiling, and likewise the portion of the ends of the building coming in contact with the corn, the needed air would find admittance. Other and ample provisions for a free and direct circulation of air throughout the building are supposed to be provided.

Further buildings, as barn, workshop, an office or general resorting room, a cook-room, previously mentioned as profitably adjoining early chicken houses to aid in heating the latter, and more or less shedding for the storing of coops and implements, must follow. The details of these are not of such great importance, yet time spent beforehand in careful planning with view to economy of construction and after labor in their spheres of operation, would never be regretted. The last named—shedding—is equally as important as the others, and will prove itself continually useful. An excess of early chickens, beyond the regular accommodations, would here find comfortable quarters, and if the usual bounds be overstepped and more hens than common are wished to be set, by the proper employment of a few lengths of movable fence, suitable provision for these also could be made here. A good cellar would be indispensable for

the storing of a winter supply of potatoes and roots, and would be properly located under the barn.

The little heating that may be admissible in the laying houses, and only then in the coldest of winter, and in our northern clime, can easily be obtained from a small coal stove. Again let me say—if resorted to at all—the stove must be run at a very low temperature, scarcely perceptible. A greater heat will prove disastrous. To equalize the temperature throughout the building, let the stove be encircled by a sheet-iron heat-collector, contracting into a pipe which is carried toward one end of the house, while the smoke-pipe is run oppositely. This draws from the centre to the extremes.

DRY EARTH.—CULTIVATION.

I cannot recognize, in poultry farming, the necessity or economy of gathering and housing for after use the large quantities of dry earth that have been advocated. The advantages of dry earth as a deodorizer are beyond dispute, and to have this material on hand in abundance would be highly desirable, but for the obtaining and sheltering of it after the manner proposed. This would be performed in summer, when wages are at harvest prices, and when whatever labor was regularly employed on a poultry farm would have extra work in the way of cultivation to do,—and the difficulties attending the housing it in proper condition, perfectly free from moisture, would be incalculably greater than that of hay or grain. Again, the item of suitable shelter for it, when thus gathered, adds something to the expense that might bet-

ter be incurred in additional improvement of the fowl-houses.

It would be preferable, to my thinking, to remove semi-weekly the droppings from under the roosts—they having daily had a few handfuls of plaster scattered over them—and the rest of the house floor, to cover afresh, with light soil, twice a year—spring and fall—to the depth of, say three inches, the dirt being drawn directly from a bank. Earth, ordinarily moist, when thus spread on a floor, under a tight roof and freely exposed to the sun through ample windows, dries perfectly in a few days, and though taken from a dirt-bank—and so largely sub-soil—it will be found sufficiently absorbent for all practical purposes. By running over this daily with a fine-tooth steel rake, and depositing the rakings under the roosts, much manure that would otherwise become incorporated with the dirt will be removed, when the latter will be found to answer its purpose well for the six months. When this dirt is removed to give place to a fresh supply, it is naturally added to the compost heap.

In this manure we have a telling item on the credit side quite generally ignored. The producing power of properly-treated hen-manure can probably, with safety, be placed at half that of the average quality of guano. Thus loosely estimated, it is a very strong fertilizer; and when from the equivalent of one and a half to two bushels of grain annually consumed by each fowl, an almost like quantity of productive power is found in the excrement, the amount of plant food can be roughly approximated.

The disposition of this to the best advantage is to be dictated by circumstances. If an acre of land to each one hundred fowls is cultivated yearly, and all the manure resulting from that number is applied to it, a system of truck-farming had best follow, perhaps. In case much less land was devoted to this purpose, gardening would make the most satisfactory return, while, if no land is to be spared, the manure must be marketed as well as it can be, which seldom is justly remunerative. If, on the other hand, the land is not limited, the manure would, most likely, be devoted to the growing of ordinary farm crops.

It is important that the soil to be given to poultry keeping be of a rather light nature,—sandy loam being about the aim. Such would be the best for cultivation as well as for the fowls, while a lighter soil would be correspondingly objectionable for either.

LOCATION.

The location as to the country in general is not of such vital importance as it may at first seem, though it is important. Labor varies but little the country over. The cost of production and the market value of the product bear about the same proportion the one to the other. At the same time as the great markets are located mainly in the Eastern and Middle States these sections afford the advantage of freshness in marketing, which condition always commands a liberal advance over more distantly-shipped eggs or fowls. Climate has its

influence too, the more so when winter eggs or early chickens are especially sought.

A near market, where one can deliver his produce personally, is certainly desirable on several accounts, not the least of which is the avoidance of packing and shipping. Running on a regular route and distributing eggs as one would milk, as recommended by Mr. H. H. Stoddard in his book entitled "*An Egg Farm*," is probably the most profitable mode of disposing of them, though could the custom of a good hotel or two be obtained at a slight discount, such would on the whole, be more satisfactory. In the absence of a sufficient home market, a railroad communication has, of course, to be resorted to for reaching a larger one.

In the matter of market, England is much better off than we are. Hers is guaranteed beyond a shade of doubt, as the annual importation of eggs into that country from the Continent—mainly France—is in amount marvelous. The small number of farms, considering her population, has limited her home production of eggs and poultry. With us it is not so. Ours is largely an agricultural country, and the rural population bears a very different proportion to the urban here from what it does in Great Britain. An adjunct, as a matter of course, to every farm is a flock of fowls, consequently the country is full of poultry, and this, however indifferent, has, in times past, met the pressing demands of the market, and doubtless will continue to do so, after a manner, for some time to come.

The fact that all these farms pour into the market,

year after year, their surplus eggs and fowls, ignorant of the cost of production—and in many cases at little or no cost—should be carefully regarded by the poultry farmer, and his course shaped accordingly. Fall and winter is evidently *his* time, as is spring and summer the general farmer's. Let him run his establishment with a view to covering these seasons, and he need have no fears as to serious competition from the productions of ordinary farms. Nor do I think the profits of the undertaking will ever permanently be lowered beyond a justly remunerative point, through the competition of poultry breeders. The law of supply and demand will surely make no exception of poultry breeders. It would be strange if it had not its fluctuations as have other enterprises, and if it should not at times descend below what is to be considered fairly profitable. What business does not experience these changes? In every calling they are to be met and weathered. A few, by dint of steadiness, perseverance, and keen business insight, make their vocation a success; others in less degree still make a living by it, while yet others—and many—fail. So, I ween, it will be with poultry keeping.

This is also important, that the supply of a nice article of food always creates a demand. This, for instance, was the case with asparagus and tomatoes. And in these, even the appetite itself was to be formed. A case more parallel may be found in the history of peach, grape, and strawberry raising. The appetite already existed, but people were unaccustomed to the use of them as at present. When fresh eggs become attainable by the

masses, there will be quadruple the number used in the large towns.

PROFITS.

In attempting to make estimates as to what would be a likely return for such an investment as this, several things are to be considered. The yield of a hen, and the market value of her product, are contingent on many circumstances. It should be safe to count on ten dozen eggs per hen—appreciably less than this would indicate disarrangement somewhere—and for my own part, I could not feel that all had been done that might be, as well as not, until the average should reach full twelve, at least. It would not require such an overstraining on the part of fowl or keeper to reach this latter figure. Simply wholesome care and judicious selection. Price is a delicate thing to touch on, it varies so with seasons and location. Taking for granted that the majority of the eggs are laid in the course of the fall and winter months, when prices range high, and supposing the market to be from Philadelphia eastward, and eggs well sold, could not thirty cents per dozen be had? I think so; or very close to it.

Then, chickens are to be considered in addition. The two-year old hens on going to market, provided they are of fair size, and good condition, will amply repay for raising a number of early pullets to the laying age, while the turning off cockerels as broilers at twelve weeks old will leave something of a margin over their rearing, if sold at from \$1.25 to \$2.00 a pair, from

the last of May till early in July. Allowing twenty-five cents to be this margin on each bird, there would be half that sum to be credited to every hen when half of the layers are recruited yearly. Again, manure has to be added, which, at the lowest computaion, should be placed at twenty-five cents per capita.

Turning to the running expenses, feed demands first attention. The equivalent of one bushel and a half of grain, for average-sized fowls, will be found not far amiss. Larger birds will require a trifle more; smaller ones, in degree, less. This supply should not cause an outlay of *over* \$1.25, at most, and that to include vegetable food in winter.

From sixty to sixty-five cents a fowl ought to cover all outlay in the way of labor (cost of chicken care was included above when spoken of). With proper conveniences, one man, going to work systematically, should, it seems to me, be able to attend to from eight hundred to twelve hundred fowls in a fitting manner, nor be crowded for sufficient time. The rental of land can easily be got at. Interest and wear and tear on buildings is another—and not small—item on the debit side.

I feel that the common estimate on housing fowls, conveniently and comfortably, their grain and the necessary stock and implements, as well as the building of coops, is decidedly too low,—I know it is. It is certain that nothing can be constructed for less than about \$2.00 for every adult bird, including fixtures for raising chickens, to keep the number of grown birds good, and also the necessary adjuncts in the shape of storage for grain,

etc., and all appliances needed as auxiliaries. A few moments of figuring will convince any one of this.

Summing all up, I would not encourage one with hopes of higher profit than \$1.00 a hen per annum, though there are possibilities of considerable more. I have known the above amount to be doubled, yes, trebled. There are hundreds of instances, well proven, where \$2.00 to \$3.00, and even more, have been realized as a net average per head yearly.

The plan described in the early pages is only one of many that may be satisfactorily made use of.

There are various plans, differing in minor points, which are practicable for keeping fowls by wholesale, for market purposes, and the one described need not be insisted on so far as minor details are concerned.

Its aims, however, should be those of every plan: systematic arrangement of buildings without and within; the avoidance of crowding many fowls in one building, the rooms being at the same time well lighted and completely protected against the elements; adequate arrangements for the protection of sitters; and spacious yards, yet well defined by means of fence, for laying and breeding stock.

RECAPITULATION.

It will be useful, at the close of this treatise, to glance again over what has been said, and recall the various details of the system proposed.

It has been seen that up to this time poultry breeding on a large scale has failed in England, and from

causes only too apparent. They were too artificial, and too regardless of the real nature of the fowls to deserve success.

It was shown, also, that one must not enter into the business with expectations of pecuniary returns beyond a fair percentage, and that the extravagant reports of the immense profits sometimes realized, if not inaccurate, must be exceptional, as the profits in this business, as in others, must eventually fall to a level.

Among the elements of success, it was pointed out that the man himself must be of the right sort, must have a real and not a passing love for the work, must attend to the infinitude of detail himself, and must acquire experience before making a very large venture in the business. Intelligence, knowledge, devotion, and the most assiduous care, are all needed to insure success.

Even such a man as this would find it necessary to adopt the most rigid system.

The great guide in his work was mentioned, a strict regard for nature and the avoidance of artificiality; only by knowing the natural habits and constitutional necessities of the animals can the breeder succeed. Some of the most prominent features in the character of fowls mentioned were their love for freedom and range. Confinement tends greatly to the destruction of the spirit and vigor of even the most robust among them.

Coming to the subject of houses, it was remarked that however individual ingenuity might vary the general plan, certain main principles should be kept in view in the construction of every building. They should be

built with reference to the climate, and not merely to that of any one season, but to the changes of climate, which in the Northern States are great. The house should be well ventilated at all seasons, cool in summer and warm in winter. It was also noted that the large market breeder, requiring, as he does, an early production of eggs, must pay more attention to heat in winter than the ordinary farmer.

To produce this winter warmth, objection was not made to the ordinary expedients of glass and earth-banks, but it was pointed out that glass, as a means of giving warmth, fails in cloudy days, while earth-banks involved the expense of a stone or brick foundation, with careful drainage, and, moreover, made the house less easily accessible. In view of these inconveniences, a preference was expressed for heating by means of a stove, as being of less expense, and as assisting in ventilation, while the inconveniences mentioned are avoided.

The extra land between the houses, for cultivation, might be located elsewhere, and the yards of every row of buildings reach on one side to the next. Then, as fowls always soil the ground most immediately about their houses, the taint lessening in degree as the distance increases, they can be shut off from their present runs on the one side, and simultaneously all the rows of houses be opened on the opposite, letting the fowls out into the rear end of what was just before the runs to the neighboring row of buildings. Thus the comparatively fresh end of the runs adjoining their connected houses can be used. This change should be made year-

ly. The rear or further end of the runs just as they are about to reach the opposite row of buildings should be cut across by a movable fence, to afford a free driveway to the houses. Such a fence would need to be changed annually from one end of the yard to the other, according as the fowls are let out into the latter, this fence always cutting their connection with the houses that have just evacuated the runs, and restoring it to the neighboring ones. The side-fence of the runs should be stationary.

The importance of the proper selection of a breed of fowls was commented upon, as being fully as essential to success as any other point, the extra produce of the better hen being the source of the profit. It was claimed that "blooded breeds" were the proper breeds for the purpose, for the following reasons. Because the breeders have turned their attention to the development of the useful qualities, especially in the breeds of fowls of larger size. Their prolificness has been indirectly increased in consequence of the general care they have received, although it has not been feasible in many cases to work directly for this result. The blooded breeds also embrace strains having the valuable trait of non-sitting, something very valuable in breeding on a large scale. The most quiet, less nervous fowls are found among the pure breeds. The most beautiful fowls occur here, especially among the smaller kinds, which are bred to ornamental qualities. Finally, thorough-bred poultry can be best depended upon to *surely transmit* whatever useful qualities they may possess.

In choosing among the breeds, it was recommended that sitters and non-sitters should be pretty evenly balanced, although the latter might be in the majority if early chickens are not desired. Of the sitters, the quiet, hardy, winter-laying Brahmas, the hardy Dominique, and the fine-fleshed Plymouth Rock were chosen; the quarrelsome Game, the oft-sitting Cochin, and the perhaps not yet acclimated Dorking being objected to. Among the non-sitters, the white and brown Leghorns, and the Houdans were preferred, as being fine meated, maturing early, and not so liable to colds and roup as the other non-sitters. The depressing influences of domestication with fowls, as of civilization with men, must be met and counteracted by the practice of the two chief principles, selection of the fittest for, and extra care of, parent stock.

While table qualities have received more or less direct attention in all our larger breeds of poultry—in some, size and symmetry being paramount—the production of eggs has not been directly or intentionally increased by breeders, in either the large or small varieties, and this is, to a very great extent, necessarily so. To breed directly with a view to increasing the yield of eggs in hens, as has been done that of milk in cows, is really unfeasible. The production of eggs and milk are widely different offices. The laying of an egg is the act of parturition with a hen—the egg containing the chicken to be—while the milk yielded by a cow is but the food for the maintenance of her offspring. In a state of nature the number of eggs laid by a hen were gauged

by her ability to brood them, while the cow only gave a quantity commensurate with the demands of the calf. Man by domestication has placed these functions subservient to his wants, and now we see the hen producing her ten dozens of eggs during the year, while the flow of milk in the cow has been greatly increased and prolonged. By the careful selection of a few fowls, and the keeping of a pedigree of the same, as also an account of the eggs laid by them, and from their product selecting others, those proving themselves the best layers, prolificacy might perhaps be increased, but when fresh blood should be demanded—and it cannot be introduced too often—unless a number of yards were run, or others were acting in concert from whom fowls could be procured that had gone through the same process, the labor would be lost. The great difficulty attending all attempts at direct increase of egg production would be want of external guides, whereas in the case of the cow there are many points—such as milk veins, udder, escutcheon, fineness of head, horns and tail, color of skin, etc.—when in perfection, all collectively indicating abundance or richness of milk. All that can be done practically toward developing prolificness is to select vigorous, square-built birds, avoid all “in and in breeding,” house comfortably and dryly, and feed forcibly but carefully. But while, as seen, man has done and can do little directly for the furtherance of egg production in blooded fowls, still prolificness is possessed by many breeds in a great degree, resulting, doubtless from the combined influence of feed, extra care, favorable surrounding circumstances, climate,

change of climate, etc. The known winter laying quality is not the result of breeding in the Brahma and Cochin, still in this particular how they surpass all other fowls! The acknowledged egg-producing powers of the Spanish, Leghorn, Hamburg, Poland, Game, and the French breeds, owe nothing directly to the breeders' skill. Before ever an Asiatic had left the confines of the Orient, or ever a poultry exhibition had gathered together the feathered tribe in competition, the "Dutch every day layers," and the "everlasting layers," implying Hamburgs and Spanish were household words. Such popularity in the absence of any "poultry-mania," and while the poultry fancy was still in its infancy, in fact before the subject of poultry improvement had fully obtained a foothold, could not but have a practical foundation.

"Improved *versus* common fowls," the much agitated question, here propounds itself. To form an analogy between other blooded stock and poultry as to the practical *results* attained—though a comparison of *means* cannot be closely made—ought, in connection with the constant demonstration of the fact by experience, to be convincing proof of the superiority of the latter over "dung-hill" stock.

In the first place, the power of uniform transmission of useful qualities (bad as well, if possessed), that is the characteristic of everything thorough-bred, is fully possessed by improved poultry. Now as to the useful qualities. Those characterizing the several breeds of cattle, sheep, and swine, also the horse, whatever they may be, are almost entirely the direct result of breeding—

climate and other molding influences playing but an insignificant role in their formation. Color excepted almost every point considered standard in the judging and breeding of thoroughbred farm stock, tends more or less directly to utility and is in a great measure an index of it. In comparing with blooded stock the useful properties of blooded fowls, the products of the latter, flesh and eggs, have of necessity to be divided, as they are in the main the results of the workings of different agents. For the superior table qualities possessed by many of our varieties, we are to a great extent indebted to breeders. This is especially the case with Bronze Turkeys, Toulouse and Embden Geese, Rouen, Aylesbury, and Cayuga Ducks, the English Dorking, the Houdan, Creve Cœur, La Flèche, and Plymouth Rock. To what the Asiatics owe their size it is impossible to say, though since imported they have been brought more thoroughly within the bounds of symmetry, and their weight somewhat increased. In the smaller breeds ornamental qualities have been the all-absorbing aim of fanciers, and quite properly so. No finer field for the cultivation and enjoyment of the beautiful is presented in the whole order of creation, nor one more nearly within the reach of all, than poultry, both land and water; and that busy, active America may in this respect take a lesson from her slower and more philosophical sister England, whose people from the highest to the lowest possess and gratify a taste for the beautiful in nature, is greatly to be desired.

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